

## Non-destructive speleothem investigation for paleoearthquake records

Erika Hegymegi (1), Katalin Gribovszki (2,4), Miklós Gyöngy (3), Götz Bokelmann (4), and Csaba Hegymegi (5)

(1) University of West Hungary, Sopron, Hungary (ehegymegi@yahoo.com), (2) Geodetic and Geophysical Institute, Research Centre for Astronomy and Earth Science, Hungarian Academy of Sciences, Sopron, Hungary (katalin.gribovszki@univie.ac.at), (3) Pázmány Péter Catholic University, Faculty of Information Technology and Bionics, Budapest, Hungary (gyongy.miklos@itk.ppke.hu), (4) Department of Meteorology and Geophysics, University of Vienna, Austria (goetz.bokelmann@univie.ac.at), (5) Acoustic Geophysical Services Ltd.

Earthquakes often irreversibly destroy cave formations as a co-seismic effect. These damages in the speleothems have been seen for thousands of years, as long as the cave exists after the occurrence. The cracks, broken surface, hiatus in the speleothems can provide very good indications of paleo-earthquakes. Comparing these evidences with the historical earthquake data from the past we can match the physical evidences with the earthquakes. In case of the missing these evidences regarding a vulnerable stalagmite we can say that earthquakes didn't occur in the past to break or destroy it. On the other hand, these speleothems are strictly protected natural objects in Europe. Therefore, it is impossible to examine them in the laboratory with conventional equipment such as computer tomography (CT) or X-ray, because this would require taking samples. With the presented non-destructive ultrasound methods we tried to detect paleo-earthquake records inside the stalagmites on the mm scale in situ, in the cave.