



Estimation the upper limit of prehistoric peak ground acceleration using the parameters of intact stalagmite in Plavecka Priepast, PP2 Slovakia—Seismic Hazard of Vienna and Bratislava

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A specially shaped (high, slim and more or less cylindrical), vulnerable, intact stalagmite (STM) in Plavecka Priepast PP2 has been examined last year. This STM is suitable for estimating the upper limit for horizontal peak ground acceleration generated by paleoearthquake.

The method of our investigation is the same as before:

- the density, Young's modulus and tensile failure stress of broken STM samples (lying at the same hall of PP2, as the investigated stalagmite) have been measured in mechanical laboratory;
- the height and diameters of the intact STMs, as well as its natural frequency have been determined in situ;
- theoretical calculations based on these measurements then produce the value of horizontal ground acceleration resulting in failure, as well as the theoretical natural frequency of the STM;
- core samples were taken from a column dripstone standing in the same hall as the investigated stalagmite to obtain the age of the stalagmite, by Multi Collector – Inductively Coupled Plasma Mass Spectrometry analysis (MC-ICPMS).

This technique can yield important new constraints on seismic hazard, as geological structures close to Plavecka Priepast PP2 cave did not generate strong paleoearthquakes in the last few thousand years which would have produced horizontal ground acceleration larger than the upper acceleration threshold that we determine from the STM. These results have to be taken into account, when calculating the seismic potential of faults near to PP2 cave as well as in Vienna basin Markgrafneusiedler fault. A particular important of this study results from the seismic hazard of two close-by capitals: Vienna and Bratislava.